

Date: Thu, 3 Mar 94 04:31:03 PST
From: Ham-Homebrew Mailing List and Newsgroup <ham-homebrew@ucsd.edu>
Errors-To: Ham-Homebrew-Errors@UCSD.Edu
Reply-To: Ham-Homebrew@UCSD.Edu
Precedence: Bulk
Subject: Ham-Homebrew Digest V94 #48
To: Ham-Homebrew

Ham-Homebrew Digest Thu, 3 Mar 94 Volume 94 : Issue 48

Today's Topics:

 Comments on TAPR-2 board?
 Help understanding FM and SSB
 Impedance matching prob.-AM carr. current
 Looking for a keyboard for a HaL Telereader
 Looking for Lex... (2 msgs)
 Looking for sources of ferrite rod
 Radio 20m Travel Radio
 Re: How to measure low power @ VHF & above.

Send Replies or notes for publication to: <Ham-Homebrew@UCSD.Edu>
Send subscription requests to: <Ham-Homebrew-REQUEST@UCSD.Edu>
Problems you can't solve otherwise to brian@ucsd.edu.

Archives of past issues of the Ham-Homebrew Digest are available
(by FTP only) from UCSD.Edu in directory "mailarchives/ham-homebrew".

We trust that readers are intelligent enough to realize that all text
herein consists of personal comments and does not represent the official
policies or positions of any party. Your mileage may vary. So there.

Date: Tue, 1 Mar 1994 18:10:58 GMT
From: ihnp4.ucsd.edu!agate!howland.reston.ans.net!europa.eng.gtefsd.com!
news.umbc.edu!eff!news.kei.com!world!dts@network.ucsd.edu
Subject: Comments on TAPR-2 board?
To: ham-homebrew@ucsd.edu

In article <1994Feb28.202528.6888@newsgate.sps.mot.com> rapw20@email.sps.mot.com
writes:

>Has anyone out there built a TNC from the TAPR-2 circuit board? If so, I'd be
>interested in hearing about it. Specifically, how difficult was it to locate
>parts, was it any cheaper than buying a used 1270 or other clone, any problems
>getting it to work?

>

>I'm looking for a (relatively) cheap entry into the 9600bps packet world and
>building a TAPR TNC and adding the 9600 modem seems like one way to do it.

>
>Any comments will be appreciated.
>
>Thanks & 73... Mark AA7TA

I have built one and have a second partially complete. You would certainly do better buying a TNC instead. DSRI has some with 9600 built in, and so forth. The biggest advantage I see with the TAPR modem is the ability to do bit regen, but that is only an issue for your full duplex packet repeater, not for user equipment.

Dan

--

Daniel Senie Internet: dts@world.std.com
Daniel Senie Consulting n1jeb@world.std.com
508-365-5352 Compuserve: 74176,1347

Date: Wed, 2 Mar 1994 09:12:59 GMT
From: ihnp4.ucsd.edu!swrinde!gatech!wa4mei.ping.com!ke4zv!gary@network.ucsd.edu
Subject: Help understanding FM and SSB
To: ham-homebrew@ucsd.edu

In article <2kvoos\$t5v@crocus.csv.warwick.ac.uk> maupb@csv.warwick.ac.uk (Jason Saunders) writes:

>I've read the RSGB's RAE manual, and still have difficulty with their
>descriptions of FM and SSB. In FM, as I understand, the frequency of the
>carrier is modulated by the amplitude of the speech. So why does the bandwidth
>of the RF signal matter? If you have, say a 28Mhz carrier and the bandwidth of
>the Rf signal is 5kHz, why should that limit the audio bandwidth to 5Khz? If
>you send a 20kHz audio signal surely the RF signal would just oscillate
>between 28Mhz+-5kHz at 20kHz? I realise that filtering the output is important
>to remove any harmonics, but as you can see I'm quite confused about the
>bandwidth issue.

$$A * [\cos(W_o * t) - \frac{\Delta \phi}{2} * \sin(W_o + p) * t - \frac{\Delta \phi}{2} * \sin(W_o - p) * t]$$

That really says it all. :-)

But perhaps a little simplified verbal description might be in order. Modulation and mixing go hand in hand. You can't have one without the other. Let's break down the FM equation into it's parts. The $\cos(W_o * t)$ represents the carrier wave. The $\Delta \phi$ (don't have Greek symbols on this keyboard) represents the deviation. And $\sin(W_o + p) * t$ and $\sin(W_o - p) * t$ represent the upper and lower sidebands respectively with p being the

modulating frequency. So you can see that the upper sideband consists of the sum of the carrier and modulating frequencies times half the deviation, and the lower sideband is the product of the deviation and the difference between the carrier and modulating frequencies. So FM has sidebands too, like AM, but multiplied by the deviation. Note these are **vector** quantities and don't combine in a naive way, and note that all of these components wind up being multiplied by A, the signal amplitude, a constant. Rule of thumb for FM occupied bandwidth: two times the highest modulating frequency plus the deviation is occupied bandwidth. So a NBFM transmitter with a highest modulating frequency of 5 kHz and a deviation of 5 kHz will occupy approximately 15 kHz of bandwidth. The amplitude of the whole complex wave is constant, but is shared among the components in a fairly complex manner. For example there are certain modulating frequencies that when combined with certain deviations will result in a carrier with zero power, and all the power in the sidebands. These are called Bessel nulls and are handy ways of measuring deviation.

>The other thing is SSB. I get the general idea of using power more efficiently
>by sending half the audio waveform as the other half is going to be a mirror
>image, and removing the carrier as we want to concentrate power on the signal
>instead of the carrier. What I don't get is how one removes the carrier and
>then adds it back again. Can someone explain that, please?

$$A \cos(\omega t) + a/2 \cos((\omega + p)t + \phi) + a/2 \cos((\omega - p)t - \phi)$$

Again we're mixing, but this time the carrier has a constant amplitude, A, and the sidebands have a variable amplitude, a/2 where a is the amplitude of a particular modulating frequency. Notice the $\omega + p$ and $\omega - p$ parts that are the sum and difference frequencies of the carrier and the modulation, the upper and lower sidebands respectively. If we use a balanced mixer, the $A \cos(\omega t)$ will cancel because of the 180 phase shift, removing the carrier. If we do this mixing twice, in separate mixers, but with one mixer having ω shifted 90 degrees, and then combine the outputs, we can eliminate one of the sidebands. This is the phasing method of SSB generation. Or we can use a narrow filter to chop off the other sideband from the output of a single balanced mixer. That's the way it's typically done in amateur equipment.

What we have left is a faithful copy of the original modulation, but translated in frequency to a band near that of the original carrier. We can then use another simple mixer with a local carrier to mix this signal once again. We'll get a sum frequency that's a higher RF frequency, local carrier+modulation, and a difference frequency that's **constant** - modulation, or just the original audio with a DC offset. The constant is dependent on the **phase** difference between the local carrier and the original carrier. We pass the output of the mixer through a lowpass filter to get rid of the local carrier and sum frequencies, and we're left with a copy of the original audio with a DC offset. If we AC couple this to an AF

amp, we have the original audio modulation.

Easy.

Gary

--

Gary Coffman KE4ZV		You make it,		gatech!wa4mei!ke4zv!gary
Destructive Testing Systems		we break it.		uunet!rsiatl!ke4zv!gary
534 Shannon Way		Guaranteed!		emory!kd4nc!ke4zv!gary
Lawrenceville, GA 30244				

Date: Wed, 2 Mar 1994 08:09:44 GMT
From: ihnp4.ucsd.edu!library.ucla.edu!agate!howland.reston.ans.net!gatech!
wa4mei.ping.com!ke4zv!gary@network.ucsd.edu
Subject: Impedance matching prob.-AM carr. current
To: ham-homebrew@ucsd.edu

In article <CLxKBD.CH6@ucdavis.edu> changm@land.cs.ucdavis.edu (Mark William Chang) writes:

> My friend has built an AM carrier-current broadcast band
>transmitter for the community college he teaches at. He is having
>trouble trying to match the vacuum tube output stage of the
>transmitter to the AC power line. Any hints or suggestions?

Yeah, *don't do that*. The carrier current rules require that you take affirmative steps to limit radiation outside the licensed complex. The usual way to do that is with "leaky coax" distribution. The power system is too uncharacterized for this purpose.

Gary

--

Gary Coffman KE4ZV		You make it,		gatech!wa4mei!ke4zv!gary
Destructive Testing Systems		we break it.		uunet!rsiatl!ke4zv!gary
534 Shannon Way		Guaranteed!		emory!kd4nc!ke4zv!gary
Lawrenceville, GA 30244				

Date: Tue, 1 Mar 1994 15:54:34 GMT
From: ihnp4.ucsd.edu!library.ucla.edu!europa.eng.gtefsd.com!gatech!
wa4mei.ping.com!ke4zv!gary@network.ucsd.edu
Subject: Looking for a keyboard for a HaL Telereader
To: ham-homebrew@ucsd.edu

In article <17772.wrmed@mr.net> <pja@wrmed.com> writes:

>My dad has had a Hal Telereader for years (decodes CW, RTTY, etc). The
>keyboard encoder has partially failed (one row of keys doesn't work).
>
>We traced the problem to the encoder and called Hal. They don't make it
>any more. I called the manufacturer of the chip (used to be General
>Instruments, now is MicroChip), any they said they don't make it anymore.
>
>We did discover that a "standard parallel keyboard" will work. Looking
>at the schematic, it looks like uses 8 bits of data, a strobe, and
>an ACK line.
>
>I could make a serial -> parallel converter and use an IBM style keyboard,
>but I would rather pick up another Telereader or parallel keyboard.
>
>Hints?

Give us the GI part number. I suspect many of us may have junk boxes
full of the encoders. Also note that a PC keyboard does not output
ASCII. It outputs a scan code that's interpreted by the PC bios to
an ASCII value. So you need a bit more than a serial to parallel
converter to make one work on your HAL.

Gary

```
--
Gary Coffman KE4ZV          | You make it,      | gatech!wa4mei!ke4zv!gary
Destructive Testing Systems | we break it.     | uunet!rsiatl!ke4zv!gary
534 Shannon Way           | Guaranteed!      | emory!kd4nc!ke4zv!gary
Lawrenceville, GA 30244   |                  |
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Date: Wed, 2 Mar 1994 10:00:59 GMT
From: ihnp4.ucsd.edu!library.ucla.edu!csulb.edu!csus.edu!netcom.com!
tgm@network.ucsd.edu
Subject: Looking for Lex...
To: ham-homebrew@ucsd.edu
```

ka7oei@uugate.wa7slg.ampr.ORG wrote:
: I'm looking for a Lexical Analyzer for DOS.
: I haven't been able to find either a source or an executable for DOS
: (yeah, I know... get a *real* OS...)
: How about a 'port of "lex"? Does anyone know where one may be found?

lots of DOS development tools are available via ftp from:

ftp.iro.umontreal.ca:/pub/Internet/gnuish

You will find flex (a free version of lex) and bison (a free version of yacc).

Thomas
KI4N

Date: Wed, 2 Mar 1994 10:04:57
From: ihnp4.ucsd.edu!library.ucla.edu!europa.eng.gtefsd.com!
howland.reston.ans.net!pipex!sunic!trane.uninett.no!news.eunet.no!nuug!
telepost.no!a11a156.saga.no!Anders.Fongen@network.ucsd.edu
Subject: Looking for Lex...
To: ham-homebrew@ucsd.edu

In article <60290@uugate.wa7slg.ampr.org> ka7oei@uugate.wa7slg.ampr.ORG writes:
>From: ka7oei@uugate.wa7slg.ampr.ORG
>Subject: Looking for Lex...
>Date: 1 Mar 94 10:52:24 GMT

>I'm looking for a Lexical Analyzer for DOS.

>I haven't been able to find either a source or an executable for DOS
>(yeah, I know... get a *real* OS...)

>How about a 'port of "lex"? Does anyone know where one may be found?

>Thanks in advance,

><Clint>

At least, I know that "MKS Toolkit" has a lex product. I also think that GNU BISON (their LEX clone) is available for DOS.

If you find one, remember to check out which C compiler it works with.

Yours Sincerely
Anders Fongen (LA6UIA)

Date: Wed, 2 Mar 1994 04:08:14 GMT
From: ihnp4.ucsd.edu!agate!msuinfo!harbinger.cc.monash.edu.au!
bruce.cs.monash.edu.au!trlluna!titan!pcies4.trl.OZ.AU!drew@network.ucsd.edu
Subject: Looking for sources of ferrite rod
To: ham-homebrew@ucsd.edu

In article <19416.wrmed@mr.net> <wrmed@mr.net> writes:

>From: <wrmed@mr.net>

>Subject: Looking for sources of ferrite rod

>Date: Wed, 23 Feb 94 22:12:13 CST

>

>I am looking for ferrite rod for winding antennas, making inductors, etc.

>

>Since this is for a production quantity application, I would prefer

>a reliable source who might stock various sizes and shapes of ferrite

>rods, cores, and so forth.

>

>Anyone out there in the ether happen to have a name and number of a

>supplier of such items?

>

>Please e-mail replies. If people are interested in what I find out, I will

>post a summary.

>

>Thanks in advance,

>

>Paul J. Anderson - NØRIK

>Stillwater, MN

>pja@wrmed.com

>wrmed@mr.net

>nØrik@wbØgdb.stp.mn.usa

The most well-known supplier of ferrite materials for radio/electronic applications would perhaps be;

Amidon Associates, 12033 Otsego St, North Hollywood, Ca.
91607.

Pretty good data sheet available with relevant information on rods, toroids, E-cores, chokes etc..

73, Drew, VK3XU.

Date: 1 Mar 94 17:59:21 GMT

From: ihnp4.ucsd.edu!library.ucla.edu!psgrain!news.tek.com!gvgpsa.gvg.tek.com!
gold.gvg.tek.com!gvgadg.gvg.tek.com!groverc@network.ucsd.edu

Subject: Radio 20m Travel Radio

To: ham-homebrew@ucsd.edu

I came across the advertisement for the RadioKit 20 meter "Travel Radio" and would like to hear from anyone who had the experience of either building or operating same.

Grover
WT6P

Date: Tue, 1 Mar 1994 17:49:05 GMT
From: ihnp4.ucsd.edu!sdd.hp.com!col.hp.com!news.dtc.hp.com!hplextra!hpcss01!
markb@network.ucsd.edu
Subject: Re: How to measure low power @ VHF & above.
To: ham-homebrew@ucsd.edu

Thermistor mounts +10 to -10 dBm
Therocouple detectors -20 to +20 dBm
Shottky Diode detectors -70 to -20 linear, to +20 corrected

use an HP436,437,438 or Gigatronics 8541/42
for the best results

Date: Wed, 2 Mar 1994 08:05:10 GMT
From: ihnp4.ucsd.edu!library.ucla.edu!agate!howland.reston.ans.net!gatech!
wa4mei.ping.com!ke4zv!gary@network.ucsd.edu
To: ham-homebrew@ucsd.edu

References <2kio4p\$6jg@u.cc.utah.edu>, <1994Feb25.113157.19203@hemlock.cray.com>,
<mbuttsCLvAGM.AKD@netcom.com>om
Reply-To : gary@ke4zv.atl.ga.us (Gary Coffman)
Subject : Re: Challenge: Cheapest (least expensive) homeb

In article <mbuttsCLvAGM.AKD@netcom.com> mbutts@netcom.com (Mike Butts) writes:
>

>Back in the mid-1960's Novices could run phone (AM in those days)
>on 145-147 MHz. The Heath Twoer was a cheap (for then) and simple
>kit rig that was very popular. I and quite a few of my teenaged
>friends got started on hamming this way. 2 meters may be too
>crowded most places for that today, but it would sure be nice
>if a cheap simple rig like this could recreate those times for
>today's kids.

Those old AM rigs were complex compared to what we can do with
modern ICs and FM. Using the Motorola MC2833 single chip transmitter
and the MC131135 single chip receiver, you can easily build a low
power crystal controlled HT. With a synthesizer chip added, a full
800 channel HT could be assembled, and with a power brick, a complete
mobile rig.

Motorola offers evaluation kits (free if you have the right letterhead)

including chips, circuit boards, and instructions for these chips. It's really easy to make them work. A HT is a two evening project. Using these chips, it's really simple to do a complete RF section for a 9600 baud packet station. The MC131135 has a linearized output suitable for 9600 baud, and the MC2833 is direct FM. Highly recommended.

Gary

--

Gary Coffman KE4ZV		You make it,		gatech!wa4mei!ke4zv!gary
Destructive Testing Systems		we break it.		uunet!rsiatl!ke4zv!gary
534 Shannon Way		Guaranteed!		emory!kd4nc!ke4zv!gary
Lawrenceville, GA 30244				

End of Ham-Homebrew Digest V94 #48
